

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended): A method of investigating radioactive sources in a body of material provided at an investigation location, the body of material comprising a plurality of samples, the method comprising detecting a portion of the emissions arising from a sample, the detected portion relating to a detected level, the detected level being corrected according to a correction method to give a corrected level, the method being repeated for one or more of the other samples, the correction method for one or more of the samples comprising providing a generator of radioactive emissions and detecting the radioactive emissions from the generator with the sample at the investigating location, the relationship of the emissions detected with the sample at the investigating location to the emissions which would be detected with the sample absent from the investigating location determining a characteristic of the sample, the determined characteristic being a function of the density of the sample, the determined characteristic being employed as a factor in the correction method used for that sample to obtain the corrected level.
2. (Original): A method according to claim 1 in which the relationship of the emissions detected with the sample at the investigating location to the emissions which would be detected with the sample absent the investigating location is the ratio of the respective count rates for the detectors.
3. (Previously amended): A method according to claim 1 in which the relationship equates to $-\ln(R/R_0)$, where R is the rate at which the emissions are detected with the sample in place and R_0 is the rate of emissions which would be detected without the sample in place.
4. (Cancelled)
5. (Previously amended): A method according to claim 1 in which the characteristic is a function of the effective amount of material in the sample relative to one or more other samples.
6. (Currently amended): A method of investigating radioactive sources in a body of material provided at an investigation location, the body of material comprising a plurality of samples, the method comprising detecting a portion of the emissions arising from a sample, the detected

portion relating to a detected level, the detected level being corrected according to a correction method to give a corrected level, the method being repeated for one or more of the other samples, the correction method for one or more of the samples comprising providing a generator of radioactive emissions and detecting the radioactive emissions from the generator with the sample at the investigating location, the relationship of the emissions detected with the sample at the investigating location to the emissions which would be detected with the sample absent from the investigating location determining a characteristic of the sample, the determined characteristic being employed as a factor in the correction method used for that sample to obtain the corrected level, according to claim 1 in which the determination of the determined characteristic [[is]] being based on the equation: [[-]]

$$R = R_0 \exp(-\mu \rho x)$$

where R is the rate at which the emissions are detected with the sample in place and R_0 is the rate of emissions which would be detected without the sample in place; μ is the mass attenuation coefficient; x is the thickness of the sample (between source and detector); and ρ is the density of the sample.

7. (Original): A method according to claim 6 in which under the conditions of the investigation x and μ are substantially constant.
8. (Previously amended): A method according to claim 6 in which x is kept constant by fixed relative generator, detector and sample positions.
9. (Previously amended): A method according to claim 6 in which μ is substantially constant due to the energy of the generator emissions.
10. (Previously amended): A method according to claim 1 in which the characteristic is a function of the effective amount of material in a sample and the amount of material in a sample is a function of the effect on transmission of generator emissions by that sample, the total amount of material being proportional to the effects of all the samples, the fraction of the total material in a particular sample being a function of that sample's effect on transmission to the sum of all the effects.

11. (Original): A method according to claim 10 in which the fraction of the total material in a particular sample is a ratio of that sample's effect on the transmission to the sum of all the effects of the samples on the transmission.

12. (Currently amended): A method according to claim 10 in which the amount of material in a sample, V_s , equates to: $[-] -\ln(R/R_o)$.

13. (Original): A method according to claim 12 in which the total amount of material in the body of material is proportional to the sum of each sample amount, $\sum V_s$.

14. (Previously amended): A method according to claim 12 in which the fraction of the body of material in a given sample is $V_s/\sum V_s$.

15. (Currently amended) A method according to claim 1 in which the characteristic is determined based on a number of variables including one or more of, and ideally all of: $[-, :-]$

- i) the total mass of the body of material, M ;
- ii) the total volume of the body of material, V ;
- iii) the total number of samples forming the body of material, N ;
- iv) the amount of material in a given sample, V_s ;
- v) the sum of all the values proportional to the amounts of material in the

sample volumes, $\sum V_s$;

- vi) the density of the sample.

16. (Currently amended): A method according to claim 1 where the characteristic is determined based on the equation: $[-]$

$$\rho = (N \cdot M / V) \cdot (V_s / \sum V_s)$$

$$\rho = (N \times M / V) \times (V_s / \sum V_s)$$

17. (Currently amended): Apparatus for investigating radioactive sources in a body of material, the body of material comprising a plurality of samples, the apparatus comprising:

one or more detectors for detecting emissions from the sources, the detectors generating signals indicative of the emissions detected;

an investigating location into which the sample is introduced;

signal processing means for relating the detector signals to a detected level for the sources;

processing means providing a correction method for correcting the detected level for the sources to give a corrected level;

the apparatus further comprising:

a generator of radioactive emissions, at least a [[of]] portion of the emissions entering the investigating location and, in uses, the sample; ~~in-use the sample;~~

one or more detectors for detecting the generator emissions with the sample at the investigating location;

processing means for determining a characteristic of the sample based on the relationship of emissions detected with the sample at the investigating location to emissions which would be detected with the sample absent, the determined characteristic being a function of the density of the sample, the characteristic being employed by the processing means as a factor in the correction method used for that sample to obtain the corrected level.

18. (New): A method of investigating radioactive sources in a body of material provided at an investigation location, the body of material comprising a plurality of samples, the samples each being a slice which extends from one side of the body of material to the other side of the body of material, the method comprising;

detecting a portion of the emissions arising from a sample using a detector, the detected portion relating to a detected level, the detected level being corrected according to a correction method to give a corrected level, the method being repeated for the other samples forming the body of material; and

the correction method for one or more of the samples comprising providing a generator of radioactive emissions of energy greater than 400 keV, detecting the radioactive emissions from the generator with the sample at the investigation location, detecting the radioactive emissions from the generator with the sample absent from the investigation location, the relationship of the emissions detected with the sample at the investigation location to the emissions detected with the sample absent from the investigation location determining a characteristic of the sample, the relationship being based on the ratio of that count rate for emissions detected with the sample at the investigation location to that count rate for emissions

detected with the sample absent from the investigation location, the determined characteristic being a function of the density of the sample, the determined characteristic being employed as a factor in the correction method used for that sample to obtain the corrected level, the relative positions of the generator, investigation location and detector being fixed during the method.